

What is claimed is:

1. A thermoelectric conversion apparatus comprising:  
a dehydrogenation reactor for generating hydrogen and a dehydrogenated substance by an endothermic dehydrogenation reaction of an organic compound in the presence of a dehydrogenation catalyst and heat from a heat source; and  
a fuel cell for generating electricity by an electrochemical reaction of said hydrogen and said dehydrogenated substance produced by said dehydrogenation reactor, wherein self-generated heat, generated when said fuel cell operates, is supplied to said dehydrogenation reactor in addition to the heat from said heat source.
2. A thermoelectric conversion apparatus comprising:  
a dehydrogenation reactor for generating hydrogen and a dehydrogenated substance by an endothermic dehydrogenation reaction of an organic compound in the presence of a dehydrogenation catalyst and heat from a heat source; and  
a fuel cell which generates electricity by an electrochemical reaction of said hydrogen and said dehydrogenated substance produced by said dehydrogenation reactor, wherein the dehydrogenation reactor and the fuel cell are integrated into a stack.
3. A thermoelectric conversion apparatus according to claim 2, wherein said dehydrogenation reactor is constructed by stacking catalyst layers containing said dehydrogenation catalyst, and supply and discharge layers comprising a supply path for supplying an organic compound to said catalyst layers and a discharge path for discharging hydrogen and the dehydrogenated substance produced in said catalyst layers,

wherein an electricity generating layer of said fuel cell is arranged in contact with said catalyst layer.

4. A thermoelectric conversion apparatus according to claim 3, wherein said dehydrogenation catalyst and the electricity generating surface of said electricity generating layer are arranged so as to contact with each other when stacked.
5. A thermoelectric conversion apparatus according to claim 3, wherein said catalyst layers are stacked on both sides of said supply and discharge layer, and an organic compound, hydrogen and a dehydrogenated substance are supplied and discharged between said supply and discharge layer and said catalyst layer stacked on both sides of the supply and discharge layer.
6. A thermoelectric conversion apparatus according to claim 4, wherein said catalyst layers are stacked on both sides of said supply and discharge layer, and an organic compound, hydrogen and a dehydrogenated substance are supplied and discharged between said supply and discharge layer and said catalyst layers on both sides.
7. A thermoelectric conversion apparatus according to claim 3, wherein said catalyst layer and said electricity generating layer are each formed from a metal substrate.
8. A thermoelectric conversion apparatus according to claim 4, wherein said catalyst layer and said electricity generating layer are each formed from a metal substrate.

9. A thermoelectric conversion apparatus according to claim 5, wherein said catalyst layer and said electricity generating layer are each formed from a metal substrate.

10. A thermoelectric conversion apparatus comprising:

a dehydrogenation reactor for generating hydrogen and a dehydrogenated substance by an endothermic dehydrogenation reaction of an organic compound in the presence of a dehydrogenation catalyst and heat from a heat source, and

a fuel cell which generates electricity by an electrochemical reaction of said hydrogen and said dehydrogenated substance produced by said dehydrogenation reactor; and

a heating medium circulating path for circulating a heating medium between said dehydrogenation reactor and said fuel cell.